

REMARKS

The Examiner has withdrawn the rejections of Claims 6-7, 14, and 17 under 35 U.S.C. § 112, second paragraph. The Examiner has also partially maintained and partially withdrawn the rejections of Claims 1-17 as set forth in the previous Final Office Action. Claim 14 has been allowed. Claim 17 has been objected to as being dependent upon a rejected base claim.

On October 22, 2003, during a telephone interview with Robert T. Conway, Attorney for Applicants, and in the interview summary, the Examiner acknowledged that the finality of the rejection mailed May 22, 2003, was withdrawn.

Claim 17 has been rewritten in independent form, as described above. Support for the amendment to Claim 17 is found in the claims and throughout the application as originally filed. No new matter has been introduced.

Rejection of Claims 1-2 and 4-7 under 35 U.S.C. § 102(b)

The Examiner has maintained the rejection of Claims 1-2 and 4-7 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 3,770,555 to Gladstone, *et al.*, (hereinafter referred to as "Gladstone") as evidenced by U.S. Patent 3,252,848 to Borsellino (hereinafter referred to as "Borsellino").

The Examiner states that a coated belt formed from an adhesive with blocked isocyanate would be no different than a coated belt formed using both a blocked and unblocked isocyanate. The Examiner then states that without structural differences, it is the Examiner's position that the coated abrasive products would be the same, and the products of Gladstone's invention anticipate the currently claimed invention.

Gladstone discloses a dried, preformed, and partially cured adhesive film that comprises a component having available free isocyanate groups and a poly-functional active hydrogen-containing component consisting of a hydroxyl terminated polyurethane polyester and a member containing at least difunctional active hydrogen. Alternatively, Claims 1-2 and 4-7 are directed to coated adhesive belts comprising a blocked isocyanate urethane system wherein the isocyanate of the system consists essentially of blocked isocyanate. The claimed invention provides for

blocked isocyanate groups to prevent reaction with active hydrogen groups prior to removal of the blocking groups and produces improved pot life of the isocyanate urethane system and reduced sensitivity to environmental moisture.

Applicants submit that the free isocyanate of the Gladstone can readily react with available active hydrogen groups. On the other hand, the blocked isocyanate of the claimed urethane system does not substantially react until the blocked isocyanate is unblocked, for example, by heating. Applicants submit that these different mechanisms can create differences in the structure of the adhesives thus formed. Even if the Gladstone system can contain some blocked isocyanates, it contains at least a portion of free isocyanate and the free isocyanate readily reacts with the available active hydrogen groups and differences in the structure of the adhesive results, for example, due to the order of the reactions.

Furthermore, the dried, preformed, and partially cured adhesive film of Gladstone is likely to reduce penetration of the coated abrasive substrate with the adhesive and therefore can form a weaker bond, with a different structure, than practice of the present invention can provide.

Further, Borsellino does not remedy Gladstone by evidencing a blocked isocyanate urethane system wherein the isocyanate of said system consists essentially of blocked isocyanate.

Therefore, Claims 1-2 and 4-7 are patentable over Gladstone in view of Borsellino. Applicants request withdrawal of the Examiner's rejection of those claims under 35 U.S.C. § 102(b).

Rejection of Claim 3 under 35 U.S.C. § 103(a)

The Examiner has maintained the rejection of Claim 3 under 35 U.S.C. § 103(a) as being unpatentable over Gladstone. The Examiner states that Gladstone indicates that shelf life may be optimized by the choice of active-hydrogen material and that the combination of amine and blocked urethane prepolymer would have been an obvious modification to the adhesive. In addition, the Examiner states that because Gladstone teaches that active hydrogen compounds, including polyamines, having higher equivalent weights would have longer shelf life, it is the Examiner's position that the combination of such a polyamine with a blocked isocyanate would also have prolonged shelf life. The Examiner also states that active-hydrogen materials, including amines, are included in the compositions based on their equivalent weights and that

one skilled in the art reading Gladstone would envision that amines and free isocyanate could be mixed.

Applicants disagree with the applicability of the Examiner's statement that Gladstone indicates that shelf life may be optimized by the choice of active-hydrogen material. Gladstone states when one desires longer *film* shelf life, a higher equivalent weight member will be used. Gladstone discloses a dried, preformed adhesive *film* that comprises a component having available free isocyanate groups and a poly-functional active hydrogen containing component consisting of a hydroxyl terminated polyurethane polyester and a member containing at least difunctional active hydrogen. Gladstone does not teach, suggest or provide motivation for a blocked isocyanate urethane system that includes an amine.

As acknowledged by the Examiner, Gladstone requires the presence of free isocyanate groups. Figure 1 of the present disclosure illustrates the limited *pot life* of a typical prior art joint system, such as the free isocyanate-containing system of Gladstone. The Examiner states that Gladstone suggests a system containing amines and free isocyanates, but such a system is not the blocked isocyanate urethane system wherein the isocyanate consists essentially of blocked isocyanate that is described in the present claims. Instead, the suggested system is typical of the prior art joint systems. One skilled in the art can recognize that the free isocyanate of the Gladstone system would react relatively quickly with an amine and thus a relatively short *pot life* would result. The claimed invention provides for blocked isocyanate groups to prevent reaction with active hydrogen groups prior to removal of the blocking groups and produces improved *pot life* of the isocyanate urethane system, reduced sensitivity to environmental moisture, and more consistent belt joint quality. Gladstone does not teach or suggest these advantages that are gained as a result of practicing the claimed invention. Therefore, even if one skilled in the art could read Gladstone, as suggested by the Examiner, as envisioning mixing amines and free isocyanate, Gladstone does not teach or suggest a system containing amines and free isocyanate wherein the *pot life* of the system is extended and therefore one skilled in the art would not be motivated to use a combination of a polyamine and a blocked isocyanate in the Gladstone system.

Thus, Gladstone does not provide any teaching, suggestion or motivation for a coated abrasive belt comprising: (a) a strip of coated abrasive having a first portion and a second portion; and (b) a joint adhesive for joining the first portion to the second portion to form the

belt, wherein the adhesive is formed from a blocked isocyanate urethane system including an amine wherein the isocyanate of said system consists essentially of blocked isocyanate, as is presently claimed. Therefore, Claim 3 is patentable over Gladstone. Applicants request withdrawal of the Examiner's rejection of Claim 3 under 35 U.S.C. § 103(a).

Rejection of Claims 1-5, 7-13 and 15-16 under 35 U.S.C. § 103(a)

The Examiner has rejected Claims 1-5, 7-13 and 15-16 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,919,549 to Van, *et al.*, (hereinafter referred to as "Van") in view of U.S. Patent No. 4,803,257 to Goel (hereinafter referred to as "Goel"). The Examiner states that Van discloses abrasive belts that include endless belts made by cutting strips of abrasive material, applying a urethane or other splicing adhesive, joining the ends of the strips, and heating the belt. The Examiner further states that Van does not specify the type of adhesive used as a splicing adhesive. According to the Examiner, Goel teaches a polyurethane adhesive composition comprising a mixture of a polyisocyanate blocked with a phenolic compound and a polyamine curing agent. Because Goel is said by the Examiner to disclose a conventional polyurethane adhesive for flexible materials including fabric, it is the Examiner's position that it would have been *prima facie* obvious to use the adhesive of Goel in the abrasive belts of Van to form a bond from an adhesive having improved flexibility, toxicity, moisture resistance, and strength.

Goel does not teach coated abrasive belts or methods for forming coated abrasive belts. For example, Goel does not teach a coated abrasive belt comprising: (a) a strip of coated abrasive having a first portion and a second portion; and (b) a joint adhesive for joining the first portion to the second portion to form the belt, wherein the adhesive is formed from a blocked isocyanate urethane system wherein the isocyanate of said system consists essentially of blocked isocyanate, as is stated in present Claim 1. Nor does Goel teach a method for forming a coated abrasive belt comprising (a) providing a coated abrasive strip having first and second opposed ends; and (b) joining the ends of the strip with an adhesive formed from a blocked isocyanate urethane system wherein the isocyanate of said system consists essentially of blocked isocyanate, as is stated in present Claim 8.

Instead of coated abrasive belts, methods for forming coated abrasive belts or adhesives for abrasive articles (*e.g.*, joint adhesives), Goel is directed to structural adhesives. For example, Goel describes the application of the structural adhesives to polyester foam-backed cloth, stainless steel plates, plywood and aluminum sheets, and fiberglass reinforced polyester sheets, but Goel does not teach or suggest use of the structural adhesives to form belts in general, or specifically, to form coated abrasive belts. Adhesives used to form coated abrasive belts should meet demanding standards to ensure that the belt joint remains intact throughout the useful life of the belt. One of ordinary skill in the art can recognize that, when used for their intended purposes (*e.g.*, abrading or grinding), coated abrasive belts can be subjected to extremes of temperature, pressure and/or stress. Goel does not teach or suggest that the structural adhesives described therein are suitable for forming coated abrasive belts. For example, Goel does not teach or suggest that the structural adhesives described therein can withstand the extremes of temperature, pressure and/or stress to which a coated abrasive belt can be subjected.

Van does not teach or suggest methods for the formation of coated adhesive belts using a blocked isocyanate urethane system wherein the isocyanate of the system consists essentially of blocked isocyanate, as stated in the present claims. Nor does Van teach or suggest the advantages that can be gained by practice of the present invention, *e.g.*, improved pot life of an isocyanate urethane system, reduced sensitivity of the system to the humidity of ambient air, and consistent belt joint quality. Thus, Van alone does not teach or suggest the claimed invention.

Van, as acknowledged by the Examiner, does not specify the type of adhesive to be used as a splicing adhesive. Furthermore, Van does not teach or suggest that structural adhesives, such as those described by Goel, are suitable for the formation of coated abrasive belts. Goel does not teach or suggest using an adhesive formed from a blocked isocyanate urethane system, wherein the isocyanate of the system consists essentially of blocked isocyanate, in the production of the abrasive articles that are described by Van.

Since Goel describes structural adhesives, Van, even if read in view of Goel, does not teach or suggest a coated abrasive belt comprising a strip of coated abrasive and a joint adhesive, wherein the adhesive is formed from a blocked isocyanate urethane system and wherein the isocyanate of said system consists essentially of blocked isocyanate as described, for example, in Claim 1. Nor does Van, even if read in view of Goel, teach a method for forming a coated

abrasive belt comprising (a) providing a coated abrasive strip having first and second opposed ends; and (b) joining the ends of the strip with an adhesive formed from a blocked isocyanate urethane system wherein the isocyanate of said system consists essentially of blocked isocyanate, as is stated, for example, in present Claim 8.

However, Van does not provide any motivation for using Goel's structural adhesives to form coated abrasive belts. Likewise, as discussed above, Goel does not teach, suggest or provide motivation for using the structural adhesive described therein for forming the abrasive articles described in Van. Since neither reference provides any motivation for the combination of references, Applicants submit that the combination is improper under 35 U.S.C. §103(a).

Therefore, Claims 1-5, 7-13 and 15-16 are patentable over Van in light of Goel. Applicants request withdrawal of the rejection of those claims as being unpatentable over Van in view of Goel under 35 U.S.C. § 103(a).

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner believes that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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